

WHAT IS CLAIMED IS

1. A laminate containing chopped fiberglass for use in fabricating sound absorbing moldable structures, comprising:

5 a nonwoven scrim of fine denier spunbond polyester fibers having a weight between about 17 to 60 grams per square meter (0.50 to 1.75 ounces per square yard) in the form of a sheet having a front planar surface and a rear planar surface;

a non-porous thermoplastic barrier film disposed on the front surface of the nonwoven scrim; and

10 a layer of chopped fiberglass and thermoplastic adhesive disposed on the front surface of the barrier film.

2. The laminate of claim 1, wherein the nonwoven scrim has a percent elongation to break in both the machine direction and cross direction of at least between about 35 to 60 percent.

3. The laminate of claim 2, wherein the percent elongation is between about 35 to 45 percent.

4. The laminate of claim 1, wherein the tensile strength in the machine direction is less than about 7 to 10 pounds of force and in the cross direction less than about 4 to 5 pounds of force.

5. The laminate of claim 1, wherein the nonwoven scrim has a energy to
25 break in the machine direction below about 10 pound inches and in the cross direction below about 4-7 pound inches.

10049336-02102
2007-03-20 09:23:00

-16-

6. The laminate of claim 1, wherein the spunbond polyester fibers have a denier between about 1.8 to 2.2.

7. The laminate of claim 6, wherein the scrim is polyethylene terephthalate having a weight of about 34g/m^2 (1.00 oz/yd²).

8. The laminate of claim 1, wherein the thermoplastic barrier film is selected from the group consisting of polyethylene film, polypropylene film, polyamide film, polyester film and combinations thereof.

9. The laminate of claim 1, wherein the thermoplastic barrier film has one corona treated surface facing the nonwoven scrim.

10. The laminate of claim 6, wherein the thermoplastic barrier film is a thermoplastic film having a thickness between about 25.4 to 50.8 microns (1.0 to 2.0 mil or .001 to .002").

11. The laminate of claim 10, wherein the fiberglass is chopped to a length between about 2.54 to 10.16 cm (1.0 to 4.0 inches).

12. The laminate of claim 11, wherein the chopped fiberglass layer has a weight between about 30 to 200g/m^2 (0.7 to 4.7 oz/yd²) randomly dispersed on the barrier film.

- 17 -

13. The laminate of claim 12, wherein the adhesive in the fiberglass layer is a powder having a particle size between about 100 to 500 microns (.025 to .125" or 25 to 125 mils) dispersed therein.

5 14. A method of forming a laminate containing chopped fiberglass for use in fabricating sound absorbing moldable structures, comprising:

providing a nonwoven spunbond polyester scrim;

placing a thermoplastic barrier film on one surface of the scrim;

10 depositing chopped fiberglass and thermoplastic adhesive on the exposed surface of the barrier film to form a chopped fiberglass/barrier film/scrim composite;

heating the composite; and

applying pressure to the composite to form the laminate without puncturing the barrier film.

15 15. The method of claim 14, wherein the thermoplastic barrier film has a corona treated surface and the corona treated surface is disposed to face the nonwoven polyester scrim.

20 16. The method of claim 14, wherein the spunbond polyester scrim has a smooth surface and the scrim is provided with the smooth surface facing the barrier film.

17. The method of forming a laminate containing chopped fiberglass of claim 14, further including the step of cooling the laminate at the time of applying pressure.

25 18. An apparatus for forming a laminate containing chopped fiberglass, comprising:

- 18 -

a nonwoven scrim supply;

a barrier film supply;

rollers for drawing the scrim and film together as a composite therethrough;

a fiberglass chopper for depositing fiberglass on the barrier film;

5 a thermoplastic adhesive dispenser for dispensing adhesive on the fiberglass deposited on the barrier film;

an oven for heating the fiberglass composite; and

cooling nip rollers for applying pressure to the composite to adhere the fiberglass to the barrier film.

10

19. A vehicle headliner, comprising a laminate of

a nonwoven scrim of fine denier spunbond polyester fibers having a weight between about 17 to 60 grams per square meter (0.50 to 1.75 ounces per square yard) in the form of a sheet having a front planar surface and a rear planar surface;

15 a nonporous thermoplastic barrier film disposed on the front surface of the nonwoven scrim; and

a layer of chopped fiberglass and thermoplastic powder adhesive disposed on the barrier film.

20

20. The method of forming a vehicle headliner, comprising

providing a nonwoven scrim of fine denier spunbond polyester fibers having a weight between about 17 to 60 grams per square meter (0.50 to 1.75 ounces per square yard) in the form of a sheet having a front planar surface and a rear planar surface;

10049386 1024102

- 19 -

a nonporous thermoplastic barrier film disposed on the front surface of the nonwoven scrim; and

a layer of chopped fiberglass and thermoplastic powered adhesive disposed on the front surface of the barrier film

- 5 placing the headliner composite into a mold having a desired shape;
 cooling the composite; and
 removing the composite from the mold.

10 21. The laminate of claim 10, wherein the thermoplastic film is a polyolefin film.

22. The laminate of claim 1, having an elongation to break exceeding about 30-40% in both the machine and cross directions and the energy required to break is less than about 20 lbf-in. in both directions.

23. A laminate containing chopped fiberglass for use in fabricating sound absorbing moldable structures, comprising:

20 a nonwoven scrim of fine denier spunbond polyester fibers having a weight between about 17 to 60 grams per square meter (0.50 to 1.75 ounces per square yard) in the form of a sheet having a front planar surface and a rear planar surface;

 a non-porous thermoplastic barrier film disposed on the front surface of the non-woven scrim; and

-20-

a layer of chopped fiberglass and thermoplastic adhesive disposed on the front surface of the barrier film;

the components having been heated and subjected to pressure to form the laminate without puncturing the barrier film thereby providing a laminate having an elongation at break exceeding about 30-40% in both the machine and transverse directions
5 with the energy required to break less than about 20 lbf-in. in both directions.

20049386 024102